

## **MOBILIZATION / DEMOBILIZATION**

### **1. SCOPE**

This element of work shall consist of the mobilization of the CONTRACTOR'S forces and equipment necessary for performing the work required under the contract documents including the transportation of personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary facilities at the site; and other preparatory work at the site.

The work shall also include final cleanup of the work area and the demobilization of the CONTRACTOR'S forces and equipment.

### **2. MOBILIZATION**

**2.1. General:** Mobilization shall be paid as a lump sum as shown on the Bid Schedule.

**2.2. Payment:** Reimbursement for "Mobilization" shall be divided into two incremental payments per project approximately equal to 75% and 25% respectively, of the **approximate percentage value of work to be done at each project or site based on the Summary of Quantities breakdown.**

The **first payment** shall be made only after sufficient personnel, materials, equipment, and facilities have been mobilized to each particular project/site to demonstrate the CONTRACTOR'S intent to undertake the bulk of the work.

The **second payment** shall be made after an amount of work equal to 10% of the total for remaining bid items as based on percentage value for each project/ and only after an acceptable schedule has been received for each site.

Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

**2.3. Adjustments:** This specification covers mobilization for work required by the contract at the time of award. If additional mobilization costs are incurred during performance of the Contract as a result of changed or added items of work for which the CONTRACTOR is entitled to an adjustment in contract price, compensation for such costs shall be included in the price adjustment for the items of work changed or added.

### **3. DEMOBILIZATION**

**3.1. General:** Perform all work and operations necessary to accomplish final clean up including the removal of personnel, equipment, supplies, and incidentals from the project site.

**3.2. Final Cleanup:** The COMMONWEALTH will not consider the work complete and will **not make final payment** until all areas the CONTRACTOR occupied in connection with the

reclamation work have been cleaned and vegetated or permanently stabilized. This includes but not limited to removal of all rubbish, equipment, excess materials, temporary structures, weeds and all other items deemed unacceptable by the ENGINEER. All rubbish and waste materials shall be removed from the construction area and disposed in a manner consistent with all applicable state and federal laws. All property, both public and private, that was damaged in the prosecution of the work shall be restored in an acceptable manner, restore positive drainage where practical, and leave all space under structures unobstructed and in such condition that drift will not collect and induce scouring or clogging.

**3.3. Payment:** Demobilization shall be paid as a lump sum as shown on the Bid Schedule. Payment will be until the final cleanup and demobilization are completed to the satisfaction of the ENGINEER. **Demobilization will not be paid when the project is not completed within the allowed contract period.**

**Failure to install and maintain sediment control throughout the project will result in the forfeiture of demobilization. Failure to remove silt control fence (geotextile fabrics) shall result in forfeiture of demobilization.**

## **SILT CONTROL**

### **1. SCOPE**

This work shall consist of furnishing all materials, equipment, labor, and incidentals necessary for the installation of silt control facilities depicted on the Drawings and as directed by the ENGINEER. These structures shall be installed prior to any surface disturbance.

### **2. MATERIALS**

- 2.1. Silt Barrier- Bales:** Shall be either straw or hay bales, firmly bound by twine, and installed using wooden stakes as shown in the Drawings
- 2.2. Silt Barrier- Fence:** Shall conform to AASHTO M-288 for temporary silt fence. Provide fabric with a minimum height of 3 feet.
- 2.3. Silt Barrier- Wattles:** Shall be either straw or koir logs either 6 inch or 9 inch diameter.
- 2.4. Silt Check- Geotextile Bags:** Shall be non-woven medium weight filter fabric that is double stitched with polyester thread and filled with either No. 57 stone or sand and shall be between 50-60 pounds full.
- 2.5. Baffles:** Shall be made from pressure treated lumber and marine plywood forms used to lengthen flow paths in sediment basins.
- 2.6. Wooden Stakes:** Shall be hardwood, greater than 4 feet long, minimum of one and a minimum of 1-1/2 square post straight enough to provide a fence without misalignment.
- 2.7. Fasteners:** Use No. 9, one-inch long, wire staples, and/or fabric ties.
- 2.8. Stone:** Shall conform to the "Crushed Aggregate Section and Channel Lining" technical specification.
- 2.9. Gabions:** Shall conform to the "Gabion" technical specification.
- 2.10 Geotextile Tubes/Bags:** Shall be made from heavy weight non-woven geotextile with double stitched seams using high strength thread per the "Filter Fabric" technical specification. Size sleeve to accommodate a maximum 4 inch diameter pump discharge hose.
- 2.11. Concrete:** Shall be Class A concrete conforming to the "Concrete" technical specification.

### **3. CONSTRUCTION**

The ENGINEER shall direct the exact locations, configuration, and dimensions of the various types of silt control at the time of construction. These structures shall be installed prior to any

surface disturbance. As erodible areas are exposed, construct temporary drainageways where needed to divert runoff from erosive soils to the silt traps.

Schedule construction activities so that the amount of exposed soil is minimized. This is to be accomplished by disturbing only those areas, which are to be worked immediately, and by revegetating each area as soon as practical.

Silt Structures shall remain in place until the area has a substantial stand of grass to prevent erosion or as directed by the ENGINEER.

**3.1. Silt Barrier- Bales:** Place bales with 1/2 foot overlap and two stakes per bale. When placed along a contour we will turn the ends and at intervals upslope to prevent water from flowing along the fence.

**3.2. Silt Barrier- Silt Fence:** Construct continuous and traverse to the flow. Install per manufacturer's instructions or as shown on the Drawings and AML Standard Details. When placed along a contour we will turn the ends and at intervals upslope to prevent water from flowing along the fence. Overlap the fence when two sections must be tied together. Limit the equivalent runoff area to 1,000 square feet per 10 feet of temporary silt fence. **The fence must be trenched in place.**

| Silt Fence Design Constraints |                   |                         |
|-------------------------------|-------------------|-------------------------|
| Average Slope Steepness       | Max. Slope Length | Max. Silt Fence Length* |
| Flatter than 5:1 (< 2%)       | 300 feet          | Unlimited               |
| 50:1 to 10:1 (2-10%)          | 125 feet          | 1,000 feet              |
| <10:1 to 5:1 (>10-20%)        | 100 feet          | 750 feet                |
| <5:1 (>20%)                   | 40 feet           | 250 feet                |

\*Maximum length refers to distance between "J" hook sections.

**3.3. Silt Barrier- Wattles:** Install per manufacturer's instructions or as shown on the Drawings.

**3.4. Silt Check- Geotextile Bags:** Shall be placed at the inlet end of all structures such as culverts and drop boxes.

**3.5. Silt Check- Rock:** Stone silt structures shall be installed at the locations shown on the Drawings or as directed by the ENGINEER and in accordance with the AML Standard Details current edition. This practice is not to be used as a sediment trapping device. Sediment-laden runoff must pass through a sediment trapping practice prior to being discharged from the site. Velocity calculations are to be based on the 2 year, 24 hour frequency storm event. Accumulated sediment must be removed when it reaches one-half the height of the weir crest. Locate stone check dam(s) to provide maximum velocity reduction. This may be achieved by considering the volume of runoff, the drainage area, and the slope. Place stone check dams in reasonably straight sections of the flow channel to minimize the potential for erosion in the channel bend. The height of the stone outlet weir crest must not exceed one-half the depth of the swale. Additionally, the maximum height to the weir crest must not exceed 2 feet to prevent scour at

the toe of the dam. The stone check dam must extend from bank to bank of the swale with the weir section length in the center of the dam. If these provisions cannot be met, an engineering analysis must be conducted.

**3.6. Silt Trap- Type A:** These are intended for small watersheds (<2-ares) or in series for sediment laden water. Construct excavated pits from 2-4 feet in depth, 20-30 feet in length, and 5-10 feet in width. Transport excavated materials to the waste area or area designated by the ENGINEER. The ENGINEER may elect to convert this item into a permanent trap using the appropriate AML Standard Detail as a template. Traps need to retain a 3:1 (minimum) flow path. Install baffles or turbidity curtains if the standard design length cannot be obtained (incidental).

**3.7. Silt Trap- Type B:** Construct excavated pits from 2-4 feet in depth, 20-30 feet in length, and 5-10 feet in width and line the outside with Class II/III to contain all flow with a low spot in the middle of dike to control the flow of water from the area. The rock berm should not exceed 4 feet high. Transport excavated materials to the waste area or area designated by the ENGINEER. The ENGINEER may elect to convert this item into a permanent trap using the appropriate AML Standard Detail as a template. Traps need to retain a 3:1 (minimum) flow path. Install baffles or turbidity curtains if the standard design length cannot be obtained (incidental).

**3.8. Silt Check- Gabion:** All gabion silt structures shall be installed at locations shown on the Drawings or as directed by the ENGINEER.

**3.9. Concrete Weirs:** Construct and install concrete weirs into original ground as noted on the Standard Detail. They may be formed and poured in place or pre-cast. Pre-cast units may require additional concrete to extend the edges into original ground.

**3.10. Silt Check- Tubes/Bags:** Install at the locations shown on the Drawings or as directed by the ENGINEER. DAML will test the water flowing from these tubes/tubes to determine if further treatment is required in accordance with the "Water Treatment and Disposal" technical specification.

Tightly seal sleeve around the pump discharge hose with a strap or similar devise. Place filter bag on suitable base (e.g. mulch, woodchips, sand, or straw bales) located on a level or 5% (max) sloping surface. Discharge to a stabilized area. Extend base a minimum of 12 inches from edges of bag. Control pumping rate to prevent excessive pressure within the filter bag in accordance with the manufacturer recommendations. As the bag fills with sediment, reduce pumping rate. Remove and properly dispose of filter bag upon completion of pumping operations or after bag has reached capacity, whichever occurs first. Spread the dewatered sediment from the bag in an approved upland area and stabilize with seed and mulch by the end of the work day. Restore the surface area beneath the bag to original condition upon removal of the device. Replace filter bag if bag clogs or has rips, tears, or punctures. During operation keep connection between pump hose and filter bag water tight. Replace bedding if it becomes displaced.

**3.11. Perimeter Dike & Swale:** Construct around the project area to prevent adjacent clear surface runoff from crossing onto actively disturbed soils within the project area. Remove and dispose of trees, brush, stumps, obstructions, and other objectionable material so as not to interfere with proper function of the dike/swale. Excavate or shape the dike/swale to line, grade, and cross section as specified on the Drawings and/or Special Conditions. Bank projections or other irregularities are not allowed. Construct dike/swale on an uninterrupted, continuous grade, adjusting the location due to field conditions as necessary to maintain positive drainage. Stabilize the channel by lining with Type A ECB and seed or heavy weight non-woven filter fabric. Provide outlet protection as required. Stabilize the dike/swale within 3 days of installation. Stabilize dike/swales used for clear water diversion within 24 hours of installation. Maintain line, grade, and cross section. Remove accumulated sediment and debris, and maintain positive drainage. Keep perimeter dike/swale and point of discharge free of erosion. Upon removal grade area flush with existing ground and vegetate within 24 hours.

**3.12. Maintenance:** The Resident Inspector will inspect all erosion control devices weekly and after each 0.1-inch rainfall event and notify the CONTRACTOR as to areas that must be addressed. **Critical failures will be addressed immediately unless site conditions are too dangerous non-critical must be corrected within 1 business day all other problems must be corrected within 5 days.** All deficiencies and corrections will be recorded in the onsite inspector's daily report. Critical failures include any area where water leaves the project site. Remove all accumulated silt when the devices are 50% full and place in approved waste areas.

Upon completion of the project, the ENGINEER may direct the CONTRACTOR to remove, clean, or replace silt control structures and revegetate such disturbances in accordance with the "Revegetation" technical specification. **Silt control fence (geofabrics) shall be removed and disposed of properly at the end of construction activities.**

**Failure to install and maintain sediment control throughout the project will result in the forfeiture of demobilization. Failure to remove silt control fence (geotextile fabrics) shall result in forfeiture of demobilization.**

Following final project acceptance by the ENGINEER, DAML will be responsible for identification and correction of deficiencies regarding ground cover and other storm water BMPs not created because of the CONTRACTOR'S workmanship and/or materials or landowner disturbance.

## **SITE PREPARATION**

### **1. SCOPE**

The work shall consist of the clearing, grubbing, and/or stripping of all construction areas as shown on the Drawings, and removing and disposing of any trash and debris within the project limits. In addition, pipe removal and disposal shall be considered part of Site Preparation.

### **2. CLEARING AND GRUBBING**

All trees, snags, logs, stumps, shrubs, rubbish, and garbage shall be removed from the cut and fill areas shown on the Drawings or as directed by the ENGINEER.

Unless otherwise specified or directed, all stumps, roots, and root clusters having a diameter of 1 inch or larger shall be grubbed out to a depth of at least 1 foot below ground surface in all designated areas.

Install silt control barriers and temporary diversions as each 200 linear foot section of disturbance occurs. All disturbed ground must have a sediment control perimeter established at the end of each work day. This includes all temporary clear water diversions, silt barrier (bale & fence), and installation of silt traps where water would leave the project site or the disturbed area.

### **3. STRIPPING**

Strip areas on which excavation or fill operations are to be performed of all vegetation, topsoil, and other organic material.

Stripped soil material shall be utilized or disposed of in a manner directed by the ENGINEER. Stockpiling of topsoil-type material will be required.

### **4. DISPOSAL**

All trees cleared from the construction areas, including the waste areas, belong to the surface owners. Transport to and store trees on the individual surface owner's property at locations designated by each owner.

Dispose of all remaining cleared and grubbed material as noted on the Drawings, Special Conditions, and as directed by the ENGINEER in a manner not detrimental to the project or the inhabitants of the area. The main disposal method shall be burning and/or windowing. The contract documents may require chipping for some projects. The CONTRACTOR will be responsible for determining and complying with local ordinances, regarding disposal, and/or burning of such materials.

**4.1. Chipping:** Chip trees up to 20 inch diameter as use as onsite mulch product or for erosion control. The chips may be no larger than 3 inch long and 1 inch wide.

**4.2. Windrowing:** Create rolled piles generally not exceeding 10 tall and with breaks of greater than 20 feet for every 30 feet of windrowed material. Stack logs >8 inches in diameter in parallel piles in lengths <20 feet. Cut small tree tops and smaller trees into maximum <6 feet lengths and stack in separate parallel piles not to exceed 6 foot in height. Place tree stumps in front of the windrow in an upright position. Do not leave this material in a manner that will create erosion problems or an aesthetically displeasing feature.

**4.3. Burning:** Open burning of any shall be accomplished in strict accordance with current Kentucky Division of Forestry rules and precautions and then only with the approval and under the direction of the ENGINEER. The ENGINEER'S permission to burn and/or his presence at the site shall not be construed as relieving the CONTRACTOR of any responsibility in the event damage occurs or a citizen's complaint arises. The COMMONWEALTH accepts no responsibility for damage or costs associated with burning operations. Before burning, obtain the consent of the landowner on which burning is to be performed, notify adjacent landowners, and use "reasonable precautions" to prevent the escape of fire to adjoining lands.

**4.3.1. The "6:00 Burning Law":** KRS 149.400 established February 15 through April 30 and October 1 through December 15 as the FIRE HAZARD SEASON. During these fire seasons, everyone is prohibited from burning anything capable of spreading fire within 150 feet of any woodland or brush land, except between the hours of 6:00 p.m. and 6:00 a.m., prevailing local time, or when the ground is covered with snow.

**4.3.2. Precautions:**

- a) WAIT UNTIL AFTER 6:00 P.M. if the weather has been dry and/or windy.
- b) Burn only WHEN THE WINDS ARE CALM and there is no chance of gusts.
- c) Burn ONLY ON LEVEL GROUND. On slopes and in gullies, a fire can escape more easily and make a fast run uphill.
- d) CLEAR THE AREA ten feet around where the fire will be and make sure the OVERHEAD AREA IS CLEAR.
- e) HAVE TOOLS HANDY: a water hose, buckets of water, rakes, hoes, shovels, wet sacks, etc. These can be used to keep the flames inside the cleared area, subdue the flames if the wind picks up or the fire grows too big, smother the fire, or put a control line around it if it is getting out of hand. (More sophisticated equipment may be required by the ENGINEER.)
- f) Have more than one person to watch the fire. Be sure THE FIRE IS ATTENDED at all times by responsible people.
- g) Watch for SPOT FIRES. Cinders and sparks can carry through the air and start a "spot" of fire off in the distance.

- h) **FEED THE FIRE SLOWLY.** Do not burn everything all at once. This will control the level of burning and intensity of the fire.
- i) Stay with the fire **UNTIL THE LAST SPARK IS DEAD OUT.** Carefully inspect the burned area the next morning.
- j) **IMMEDIATELY REPORT** out of control escaped fire to the Kentucky Division of Forestry's local guard or ranger. The local fire department, county dispatcher, or state police may also help if you want to report a forest fire.

4.3.3. **Disposal:** Dispose of ash and unburned or partially burned debris in a neat and safe fashion, as approved by the ENGINEER.

4.3.4. **Restrictions:** Burning is not permitted in or adjacent to areas where coarse or fine coal refuse materials are encountered.

## **5. MISCELLANEOUS**

**5.1. Debris Removal and Disposal:** Remove domestic household trash & mining debris from the project area (i.e. construction limits, project limits, work limits, etc.) and transport to an appropriate permitted landfill. The ENGINEER must preapprove the landfill. Transport all debris in a safe manner covered or otherwise secured as necessary to prevent loss in transit.

**5.2. Pipe Removal and Disposal:** Remove and dispose of pipe noted on the Drawings and as directed by the ENGINEER to a permitted landfill. The ENGINEER must pre-approve of the landfill. All debris shall be transported in a safe manner, being covered or otherwise secured as necessary to prevent loss in transit.

## **SOIL NAILS** **(Formally Soil Reinforcing Tubes)**

### **1. SCOPE**

This work shall consist of installing soil reinforcing tubes, netting, and shotcrete (when applicable) at locations shown on the Drawings or as directed by the ENGINEER.

### **2. MATERIALS**

**2.1. Bearing Plate:** Shall be an 8 inch x 8 inch x 3/8 inch steel bearing plate attached with either a hex nut or by welding to the tubing and securing the wire mesh and reinforcing steel during shotcrete placement.

**2.2. Tubing:** Shall be round hollow galvanized steel tubing with a nominal outer diameter of 1-1/2 inch and 0.12 inch wall thickness conforming to ASTM A787-05. Tubes will be trimmed flush with the bearing plate.

**2.3. Reinforcing Steel:** Shall be 60 KSI steel conforming to the "Steel" technical specification.

**2.4. Netting:** Shall be a triple twisted galvanized wire mesh placed approximately 2 inches between the reinforcing steel and the soil face complying with the "Highwall-Slope Rockfall Netting Light Duty" technical specification.

**2.5. Grout:** The grout shall have water to cement ratio of 0.6.

**2.6. Shotcrete:** Shall have a water to cement ratio 0.4 to 0.5 and conform to the Grout Products" and "Shotcrete Application" technical specifications.

### **3. CONSTRUCTION**

Prepare the working face as stated on the Design Drawings, in the Special Conditions, or as directed by the ENGINEER. Drill 4 inch dia. holes for the tubing on a spacing stated in the plans or as shown on the AML Standard Detail. Install the tube and inner reinforcing steel rod. Inject grout into the tube until the tube and borehole are filled. After filling the holes install the chimney drains, netting, and reinforcing steel (walers) as shown on the standard detail. The surface will then be covered with shotcrete unless specified otherwise on the Design Drawings or in the Special Conditions.

# **APPENDIX A**

## **SEED MIXES**

## PURE LIVE SEED

Pure Live Seed (PLS) is determined by multiplying the percent germination of the seed times the percent purity. Then dividing this product into the specified rate yields the application.

$$\text{Seed Required} = \text{Application Rate} / \text{Germination Rate} / \text{Purity}$$

Example:      Germination Rate-      70%  
                 Purity Rate-              90%  
                 Application Rate-      50 lbs PLS/acre

$$\text{Seed Required} = 50 \text{ lbs. PLS} / (0.90) / (0.70) = 79 \text{ lbs / acre}$$

## HYDROMULCH & HYDROSEEDING (Major Incidentals)\*

The COMMONWEALTH will only pay for the use of a hydroseeder when used to apply hydromulch on project areas specified in the Drawings, Special Conditions, and on all areas where soil material has been removed to bedrock. No seedbed preparation or netting is required on these areas.

**The equipment, hydromulch, seed, lime, fertilizer, and tack are all incidental to the bid item.**

Ag-lime or rock dust meeting the requirements of this section and 100% shall pass through a U.S. Standard # 50 sieve shall be applied at a rate of 1 ton per acre and is not incidental.

## RESIDENTIAL SEEDING (Major Incidentals)\*

In areas around houses, lime, fertilizer, and seeding rates will vary and additional seedbed preparation work will be required for revegetation of residential areas. Additional seedbed preparation shall be required including hand raking and tilling.

**Residential Seeding includes seedbed preparation, lime, seed, fertilizer, straw only mulch and any other material or items necessary to complete the required work.**

\*For more information about this item refer to the "Revegetation" section of these Technical Specifications.

## SEEDING DATES

The following seeding dates will apply to all seed mixtures.

### Eastern Zone

| START DATE                | END DATE                                      | SEASON          |
|---------------------------|---|-----------------|
| March 1 <sup>st</sup>     | June 15 <sup>th</sup>                         | Spring          |
| June 16 <sup>th</sup>     | August 15 <sup>th</sup>                       | Cover Crop Only |
| August 16 <sup>th</sup>   | November 15 <sup>th</sup>                     | Fall            |
| November 16 <sup>th</sup> | February 28 <sup>th</sup> (29 <sup>th</sup> ) | Cover Crop Only |

### Western Zone

| START DATE                | END DATE                                      | SEASON          |
|---------------------------|---|-----------------|
| March 1 <sup>st</sup>     | May 30 <sup>th</sup>                          | Spring          |
| June 1 <sup>st</sup>      | August 31 <sup>st</sup>                       | Cover Crop Only |
| September 1 <sup>st</sup> | November 30 <sup>th</sup>                     | Fall            |
| December 1 <sup>st</sup>  | February 28 <sup>th</sup> (29 <sup>th</sup> ) | Cover Crop Only |

### **GENERAL RECLAMATION MIXTURE**

On slide areas replace Yellow sweet Clover with Crown Vetch

| <b>SPRING</b>             |              |
|---------------------------|--------------|
|                           | Lbs/acre PLS |
| KY 31 Tall Fescue         | 20           |
| Switchgrass               | 10           |
| Redtop                    | 5            |
| Orchardgrass              | 10           |
| Birdsfoot Trefoil         | 10           |
| Korean Lespedeza (Hulled) | 10           |
| Yellow Sweet Clover       | 5            |
| Ladino Clover             | 5            |
| Alsike Clover             | 5            |
|                           |              |
|                           | 80 LBS.      |

| <b>FALL</b>         |              |
|---------------------|--------------|
|                     | Lbs/acre PLS |
| KY 31 Tall Fescue   | 20           |
| Switchgrass         | 10           |
| Orchardgrass        | 15           |
| Timothy             | 10           |
| Redtop              | 5            |
| Ladino Clover       | 5            |
| Medium Red Clover   | 5            |
| Yellow Sweet Clover | 5            |
| Korean Lespedeza    | 5            |
|                     |              |
|                     | 80 LBS.      |

**ACIDIC CONDITIONS MIXTURE**

| <b>SPRING</b>             |                     |
|---------------------------|---------------------|
|                           | <b>Lbs/acre PLS</b> |
| KY 31 Tall Fescue         | 20                  |
| Switchgrass               | 10                  |
| Redtop                    | 5                   |
| Deer Tounge               | 10                  |
| Unhulled Bermudagrass     | 5                   |
| Birdsfoot Trefoil         | 5                   |
| Korean Lespedeza (Hulled) | 10                  |
| Flat pea                  | 10                  |
| Alsike Clover             | 5                   |
|                           |                     |
|                           | <b>80 LBS.</b>      |

| <b>FALL</b>         |                     |
|---------------------|---------------------|
|                     | <b>Lbs/acre PLS</b> |
| KY 31 Tall Fescue   | 20                  |
| Switchgrass         | 10                  |
| Orchardgrass        | 10                  |
| Timothy             | 5                   |
| Redtop              | 5                   |
| Alsike Clover       | 5                   |
| Flat Pea            | 10                  |
| Yellow Sweet Clover | 10                  |
| Korean Lespedeza    | 5                   |
|                     |                     |
|                     | <b>80 LBS.</b>      |

**HAYLAND MIXTURE**

| <b>SPRING</b>     |                     |
|-------------------|---------------------|
|                   | <b>Lbs/acre PLS</b> |
| Tall Fescue       | 30                  |
| Orchardgrass      | 20                  |
| Timothy           | 5                   |
| Ladino Clover     | 5                   |
| Medium Red Clover | 10                  |
| Birdsfoot Trefoil | 10                  |
|                   |                     |
|                   | <b>80 LBS.</b>      |

| <b>FALL</b>        |                     |
|--------------------|---------------------|
|                    | <b>Lbs/acre PLS</b> |
| Tall Fescue        | 25                  |
| Perennial Ryegrass | 10                  |
| Orchardgrass       | 15                  |
| Redtop             | 5                   |
| Ladino Clover      | 5                   |
| Birdsfoot Trefoil  | 10                  |
| Medium Red Clover  | 10                  |
|                    |                     |
|                    | <b>80 LBS.</b>      |

**PASTURE MIXTURE**

| <b>SPRING</b>       |                     |
|---------------------|---------------------|
|                     | <b>Lbs/acre PLS</b> |
| Kentucky Bluegrass  | 30                  |
| Orchardgrass        | 20                  |
| Redtop              | 5                   |
| Ladino Clover       | 5                   |
| Medium Red Clover   | 10                  |
| Alfa- Graze alfalfa | 10                  |
|                     |                     |
|                     | <b>80 LBS.</b>      |

| <b>FALL</b>        |                     |
|--------------------|---------------------|
|                    | <b>Lbs/acre PLS</b> |
| Kentucky Bluegrass | 25                  |
| Perennial Ryegrass | 10                  |
| Orchardgrass       | 15                  |
| Redtop             | 5                   |
| Ladino Clover      | 5                   |
| Birdsfoot Trefoil  | 10                  |
| Medium Red Clover  | 10                  |
|                    |                     |
|                    | <b>80 LBS.</b>      |

### **WILDLIFE MIXTURE**

| <b>SPRING</b>     |                     |
|-------------------|---------------------|
|                   | <b>Lbs/acre PLS</b> |
| Switchgrass       | 15                  |
| Sideoats Gramma   | 15                  |
| Orchardgrass      | 20                  |
| Timothy           | 5                   |
| Ladino Clover     | 5                   |
| Medium Red Clover | 10                  |
| Korean lespedeza  | 10                  |
|                   |                     |
|                   | <b>80 LBS.</b>      |

| <b>FALL</b>        |                     |
|--------------------|---------------------|
|                    | <b>Lbs/acre PLS</b> |
| Switchgrass        | 10                  |
| Perennial Ryegrass | 10                  |
| Orchardgrass       | 20                  |
| Timothy            | 10                  |
| Redtop             | 5                   |
| Alfalfa            | 10                  |
| Ladino Clover      | 5                   |
| Medium Red Clover  | 5                   |
| Korean lespedeza   | 5                   |
|                    |                     |
|                    | <b>80 LBS.</b>      |

## **BARRIER- RAIL / PIPE STEEL PANEL WALL**

### **1. SCOPE**

This work shall consist of furnishing all materials, equipment, and labor necessary for constructing the rail steel/steel panel retaining wall as shown on the Drawings or as directed by the ENGINEER. This effort includes drilling holes of required diameter, installation of rail steel piles, grouting piles in place, backfilling wall with aggregate and attaching steel panels.

### **2. MATERIALS**

**2.1. Rail Steel:** Rail steel pile sections shall be 130 pound per yard and in accordance with the standard size designation shown on the Drawings.

Rail steel shall be kept free from dirt, grease, and other foreign matter, and shall be protected from corrosion. Steel piles must be straight. Splicing of steel piles will not be permitted without permission of the ENGINEER. When authorized, all splicing shall be done in accordance with requirements specified in the AWS structural welding code and AWS D1.1 current edition with revisions.

**2.2. Grout:** Shall conform to the "Grout Products" technical specification. The materials shall have a minimum 28 day compressive strength of 3,000 psi.

**2.3. Steel Panels:** Shall conform to the "Steel" technical specification. The panels shall receive two coats of flat black rust preventative polymer paint.

**2.4. Pipe:** Shall be Schedule 80 pipe with a diameter of 6 inch and shall conform to the "Steel" technical specification. The steel pipe shall be kept free from dirt, grease, and other foreign matter and shall be protected from corrosion by coating the pipe with a rust preventive polymer paint prior to installation. The steel pipe must be straight.

**2.5. Backfill:** Shall conform to the "Crushed Aggregate and Channel Lining" technical specification.

**2.6. Guardrail Lagging:** Shall conform to the "Guardrail" technical specification.

### **3. CONSTRUCTION**

**3.1. Excavation:** Transport excavated material to the waste area. Stockpiling of excavated material on the slope above the wall will not be permitted.

**3.2. Drill Holes:** Drill a pilot hole prior to installation of the piles at wall locations shown on the Drawings or as directed by the ENGINEER. Use temporary casing of holes if needed to maintain an open, clean hole through the soil overburden (incidental). If the test boring shows rock at a different depth than assumed in the Drawings, the design shall be adjusted by the ENGINEER.

**3.3. Rail Steel Piles:** Drill holes and pump free of water prior to injection of grout. Grout the piles completely from the bottom of the hole to within 2 feet of the existing ground line, or as directed by the ENGINEER. Pump the grout through a hollow pipe beginning at the bottom of the drilled hole raising the tube with care to ensure that its tip remains approximately 2 feet below the surface of the grout until the grout reaches a point 3-5 feet below the surface. Complete all grouting operations for each hole drilled during the same work day.

**3.4. Pipe:** Drill holes and pump free of water prior to injection of grout. Cut slots in the portion of the pipe to be placed below grade as shown on the drawings or as directed by the ENGINEER for the grout to flow into the pipe center before the pipe is placed in the hole. Caps may be required to be placed on the top of the pipe if directed by the ENGINEER.

**3.5. Steel Panels:** The steel panels shall be welded, bolted, or strapped to the rail steel. All welding shall be performed by a licensed or certified welder. The steel panels shall be welded at the top, middle, and bottom and shall be overlapped 3 inches vertically and 6 inches horizontally. The ENGINEER may change the overlaps if deemed necessary.

**3.6. Guardrail Lagging:** Tack weld, bolt, or strap to the pile or pipe. Overlap the lagging 3 inches minimum horizontally and only at the post. Overlaps are not allowed between post.

**3.7. Backfill:** Backfill behind the steel wall as shown on the AML Standard Details, Drawings, or as directed by the ENGINEER.

**3.8. Tolerances:** Locate piles as shown on the Drawings or as directed by the ENGINEER. Install pile centers within  $\pm 2$  inches of the plan locations. Should the elevation of the bottom of the pre-drilled hole vary from the plan elevation more than  $\pm 1$  foot, the ENGINEER must approve the installation of the pile and injection of grout prior to placement. Utilize a plumb bob, carpenter level, or other acceptable methods to verify acceptable alignment for the ENGINEER. The maximum permissible deviation for the exposed section of piles from vertical alignment shall be based on aesthetical and structural aspects.

Record and maintain a log showing the depth pile is placed, the deviation from vertical plumb, the amount of materials used, and any unusual conditions encountered during the installation. Provide the Resident Inspector and ENGINEER a copy of this log.